94-003602

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Publications List: FY 1989-93

Division of Science Resources Studies

National Science Foundation
Arlington, VA 22230

NSF 93-321

Prepared by the
Office of the Division Director

Publications List:
FY 1989-93

Division of
Science Resources
Studies

National Science Foundation
Arlington, VA 22230

93-321

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Availability of Publications

Single copies are available free of charge from the Division of Science Resources Studies, National Science Foundation, 4201 Wilson Boulevard, Room 965, Arlington, VA 22230. If you are a user of electronic mail and have access to either BITNET or Internet, you may order publications electronically. BITNET users should address requests to pubs@nsf. Internet users should send requests to pubs@nsf.gov. In your request, include the NSF publication number and title, number of copies, your name, and a complete mailing address. Printed publications may also be ordered by fax (703-644-4278). Publications should be received within 3 weeks after receipt of request. See page following contents for availability of science and technology data on the Science and Technology Information System (STIS).

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Table of Contents

Preface v

Science Resources Studies Division 1

Science and Engineering Activities Program 3

Science and Engineering Education and Human Resources Program 7

Science and Engineering Indicators Program 13

Science and Engineering Personnel Program 17

Profiles 21

Document Order Form 23

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IV

NSF 91-10 Revised 3/30/92

Preface

This report lists publications issued by the National Science Foundation's Division of Science Resources Studies (SRS) from October 1988 through September 1993. For a listing of publications issued prior to October 1988, see *Publications List: 1978-88* (NSF 88-335).

Publications are organized by current SRS program and within each program are listed by type or category in reverse chronological order, starting with the most recent publications.

This document was compiled by Tanya R. Gore. For copies of the publications listed here call (703) 306-1780 or e-mail srspubs@nsf.gov.

The documents cited herein can also be accessed through the NSF Science and Technology Information System (STIS), explained on previous page.

The Science Resources Studies Division

The Division of Science Resources Studies (SRS) fulfills the legislative mandate of the National Science Foundation Act to "...provide a central clearinghouse for the collection, interpretation, and analysis of data on the availability of, and the current and projected need for, scientific and technical resources in the United States, and to provide a source of information for policy formulation by other agencies of the Federal Government...." To carry out this mandate, SRS designs, supports, and directs about 14 periodic surveys as well as a variety of other data collections and research projects. These surveys yield the materials for SRS staff to compile, analyze, and disseminate quantitative information about domestic and international resources devoted to science, engineering, and technology. SRS produces about 40 publications annually, which can be roughly divided into four categories:

- Detailed Statistical Tables reports and Selected Data Tables reports from the surveys, and associated *Data Briefs, Highlights,*[1] and *Previews;*

- Periodic "overview" reports, such as *Science and Engineering Indicators* or *National Patterns of R&D Resources;*

- Periodic reports on focused topics such as *Women and Minorities in Science and Engineering* and *International Science and Technology Data Update;* and

- Special, one-time reports, such as *Undergraduate Origins of Recent Science and Engineering Doctorate Recipients, Human Resources for Science and Technology: The Asian Region*, and *Using the Survey of Doctorate Recipients To Measure the Number of Academic Research Personnel.*

SRS activities require close cooperation with other Federal agencies, such as the National Institutes of Health, the National Center for Education Statistics, the Bureau of the Census, the Bureau of Labor Statistics, the Immigration and Naturalization Service, and the Department of Commerce's Patent and Trademark Office and International Trade Administration. All of the Federal agencies that perform research and development (R&D) participate in providing the data for the SRS *Federal*

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[1] *Highlights* and *Previews* are no longer produced. Back copies may be obtained from the Division of Science Resources Studies.

Funds reports. In addition, SRS staff work closely with universities, industrial firms, professional associations, and international organizations.

Upon completion of the data processing for the major surveys, SRS staff prepare and release *Data Briefs* that summarize and highlight findings in the new data prior to the lengthier publishing process for the more detailed statistical reports and analyses. The data are also provided to users in a variety of formats and customized publications.

In addition to the SRS surveys, designed and managed by SRS staff and conducted primarily by contractors, the Division also supports a small program of extramural research on such topics as methodologies and models for scientific and technological data collection, modeling for the scientific and engineering labor markets, changing patterns of national and international research performance, and the relationship between science and technological development.

Publications are grouped according to the program that produces them. The four programs are—

- **Science and Engineering Activities**
- **Science and Engineering Education and Human Resources**
- **Science and Engineering Indicators**
- **Science and Engineering Personnel**

Science and Engineering Activities Program

The Science and Engineering Activities Program (ACT) focuses on research and development funded and performed by Government, industry, and universities. Four annual surveys provide the core of information on these topics:

- The survey of *Federal Support to Universities, Colleges, and Nonprofit Institutions* collects information about Federal obligations to individual academic and nonprofit institutions by the 15 Federal agencies that provide virtually all Federal research and development funds to academic institutions.

- The survey of *Federal Funds for Research and Development* collects information about the characteristics and geographic distribution of all Federal R&D funding from the approximately 100 Federal agencies and subagencies that obligate funds for R&D.

- The survey of *Research and Development in Industry* collects information on R&D expenditures and employment of scientists and engineers from a nationally representative sample of about 23,000 companies (starting with the 1992 survey), including both manufacturing and nonmanufacturing companies.

- The survey of *Academic Science and Engineering R&D Expenditures* collects data from a sample of 460 institutions of higher education that grant science and engineering (S&E) degrees and perform a minimum level of separately budgeted R&D.

The program maintains the master list of Federally funded research and development centers and associated information mandated in the Federal Acquisition Regulations. The unit also produces (1) the Computer-Aided Science Policy Analysis and Research (CASPAR) database on CD-ROM, which provides extensive multiyear data about higher education and academic science and engineering; (2) institutional profiles that include data about S&E research and education for individual doctorate-granting institutions and for individual schools with S&E departments that grant a master's degree; and (3) public-use data tapes for the ACT academic and Federal surveys.

Recurring Reports

Detailed Statistical Tables Reports	**NSF Report Number**
Academic Science and Engineering: R&D Expenditures:	
FY 1991	93-308
FY 1990	92-321
FY 1989	90-321
Academic Science and Engineering R&D Funds:	
FY 1988	89-326
FY 1987	89-311
Federal Funds for Research and Development:	
FYs 1990, 1991, and 1992, volume XL	92-322
FYs 1989, 1990, and 1991, volume XXXIX	90-327
FYs 1988, 1989, and 1990, volume XXXVIII	90-306
FYs 1987, 1988, and 1989, volume XXXVII	89-304
Federal Funds for Research and Development, Historical Series: FY 1956-1993	93-314
Federal Funds for Research and Development: Federal Obligations for Research by Agency and Detailed Field of Science and Engineering: FY 1971-1993	93-312
Federal Funds for Research and Development: Federal Obligations for Research to Universities and Colleges by Agency and Detailed Field of Science and Engineering: FY 1975-1993	93-313
Federal Support to Universities, Colleges, and Nonprofit Institutions:	
FY 1990	92-324
FY 1989	91-316
FY 1988	89-325
Research and Development in Industry:	
1989	92-307
1988	90-319
1987	89-323
1985-86	89-316

Selected Data Tables Reports	**NSF Report Number**
Selected Data on Academic Science and Engineering R&D Expenditures:	
FY 1991	92-329
FY 1990	91-318
FY 1989	90-321
Selected Data on Federal Funds for Research and Development:	
FYs 1991, 1992, and 1993	93-319
FYs 1990, 1991, and 1992	92-319
FYs 1989, 1990, and 1991	90-327
Selected Data on Federal Support to Universities and Colleges:	
FY 1991	93-320
FY 1990	92-310
FY 1989	91-316
Selected Data on Research and Development in Industry:	
1990	92-317
1989	91-302

Special Reports

Estimating Basic and Applied Research and Development in Industry: A Preliminary Review of Survey Procedures	90-322
Guide to NSF Surveys of Academic Science and Engineering, Dec. 1991	92-301
Research and Development Expenditures in State Government Agencies: FYs 1987 and 1988	90-309
Supplemental Users Guide to NSF Surveys of Academic Science and Engineering, Dec. 1991	92-302
Planned R&D Expenditures of Major U.S. Firms: 1990-91	91-306

Data Briefs

"Annual Increases in R&D Obligations No Longer the Pattern"	93-305
"Federal Academic R&D Support Increased 10% in FY 1989"	91-301

Data Briefs—Continued

"Federal Academic R&D Support Increased by 6 Percent Between FYs 1989 and 1990"	92-328
"Federal R&D Obligations To Reach About $70 Billion in FY 1992"	92-320
"Total Federal Academic Obligations Increased 15 Percent in FY 1991"	93-304
"U.S. Firms Report Real R&D Expenditures Declining in 1991 and 1992"	92-306
"U.S. Industry R&D Expenditures Declined in 1991"	93-310

Highlights

"Growth Rate in Non-Federal Academic R&D Support Exceeds That in Federal Support Over Last Decade"	89-309
"Real R&D Growth To Slow to One Percent in 1989 and 1990"	90-308
"Modest Increase in Company R&D Funding Estimated for 1989"	89-310
"Slow R&D Spending Growth Continues into 1990s"	90-307
"Substantial Shift Toward Slower R&D Growth Reported for Decade's End"	89-301

Previews

"Federal R&D Funds Are Expected To Increase 7% in FY 1990"	SRS 90-1
"Federal Obligations for Academic R&D Reached $7.7 Billion in FY 1988"	SRS 89-3
"Modest Increase in Company R&D Funding Estimated for 1989"	SRS 89-2
"Nearly Two-Thirds of All Federal Academic R&D Awards in FY 1987 Were Received by the Top 50 Institutions"	SRS 88-5

Science and Engineering Education and Human Resources Program

The Science and Engineering Education and Human Resources Program reports on the educational system and those participating in it. The program tracks S&E enrollments and degrees and develops information on nonfinancial resources for academic R&D. The program has responsibility for two annual and two biennial surveys and one series of occasional surveys:

- The annual survey of *Graduate Students and Postdoctorates* collects data from all institutions in the United States offering postbaccalaureate programs in science and engineering. Information is collected on student status, demographic characteristics, and major source of Federal support. In 1990 the universe comprised 334 doctorate-granting and 276 master's-granting institutions.

- The annual *Survey of Earned Doctorates* collects responses from all new doctorate recipients at U.S. S&E doctorate-granting institutions, including information about their field of study, demographic characteristics, educational history, and future plans.

- The biennial survey of *Scientific and Engineering R&D Facilities at Colleges and Universities* collects and analyzes data on the availability, condition, need, cost, and funding sources of facilities from a sample of 303 research-performing colleges and universities.

- The biennial survey of *Academic Research Instruments and Instrumentation Needs* is a multistage assessment of instrumentation conditions based on information about more than 11,000 instruments from nearly 1,200 S&E departments at 55 colleges and universities and 24 medical schools.

- A system of occasional surveys of a sample of institutions of higher education addresses current issues of policy concern through quick-turnaround data collections. Recent surveys addressed undergraduate education in S&E disciplines.

The program staff also produce the Congressionally mandated biennial report *Women and Minorities in Science and Engineering* and occasional reports such as *Foreign Participation in U.S. Science and Engineering* and *Undergraduate Origins of Science and Engineering Doctorates*. Several new development activities are under way. Work has begun on a system to codify undergraduate transcripts from a nationally representative sample of colleges and universities to compile a database on patterns of S&E course-taking. Staff have also begun to collaborate with the National Center for Education Statistics on editing data for surveys of higher educational institutions, improving taxonomies of disciplines and institutions, and analyzing data on precollege science and mathematics education.

Recurring Reports

Detailed Statistical Tables Reports

	NSF Report Number
Academic Science and Engineering: Graduate Enrollment and Support:	
Fall 1991	93-309
Fall 1990	92-323
Fall 1989	90-324
Fall 1988	90-302
Fall 1987	89-315
Science and Engineering Degrees:	
1966-90	92-326
1966-89	91-314
1966-88	90-312
Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1977-90	92-327
Science and Engineering Doctorates:	
1960-91	93-301
1960-90	91-310
1960-89	90-320
1960-88	89-320

Selected Data Tables Reports

Selected Data on Graduate Students and Postdoctorates in Science and Engineering[2]*:*[2]	
Fall 1991	92-335.1-16
Fall 1991	92-335
Fall 1990	91-320
Fall 1989	90-324
Selected Data on Science and Engineering Doctorate Awards:	
1992	93-315
1991	92-309
1990	91-310
1989	90-320

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[2] **Supplementary Data Release Trends in Graduate S&E Enrollment, 1975-91 (16 pamphlets)**

Special Reports

Academic Research Equipment in Computer Science, Central Computer Facilities, and Engineering: 1989	91-304
Academic Research Equipment and Equipment Needs in the Physical Sciences: 1989	91-305
Academic Research Equipment and Equipment Needs in Selected Science and Engineering Fields: 1989-90	91-311
Blacks in Undergraduate Science and Engineering Education, April 1992	92-305
Characteristics of Science/Engineering Equipment in Academic Settings: 1989-90	91-315
Foreign Participation in U.S. Academic Science and Engineering: 1991	93-302
Scientific and Engineering Research Facilities at Universities and Colleges:	
1992	92-325
1990	90-318
Undergraduate Origins of Recent Science and Engineering Doctorate Recipients	92-332
Women and Minorities in Science and Engineering: An Update	92-303
Women and Minorities in Science and Engineering	90-301

Higher Education Surveys[3]

Survey of Mathematics and Statistics Departments of Higher Education Institutions, December 1990	Survey Number 5
Undergraduate General Education and Humanities Requirements, January 1989	Survey Number 7
The Finances of Higher Education Institutions, November 1990	Survey Number 8

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[3] **HES**: A survey system sponsored by the National Science Foundation, the National Endowment for the Humanities, and the U.S. Department of Education (Survey Number 6 was canceled).

Higher Education Surveys—Continued

Science, Mathematics, Engineering, and Technology in Two-Year and Community Colleges, December 1990 .... Survey Number 9

Systematic Biology Training and Personnel, May 1990 .... Survey Number 10

Undergraduate Course Offerings and Enrollments in Humanities, June 1990 .... Survey Number 11

College Sponsored Tutoring and Mentoring Programs for Disadvantaged Elementary and Secondary Students, May 1990 .... Survey Number 12

Plant Biology Personnel and Training at Doctorate-Granting Institutions, December 1990 .... Survey Number 13

Survey on Retention at Higher Education Institutions, November 1991 .... Survey Number 14

Survey on Undergraduate Education in Physics, December 1992[4] .... Survey Number 15

Survey on Undergraduate Education in Geology, December 1992 .... Survey Number 15

Survey on Undergraduate Education in Sociology, December 1992 .... Survey Number 15

Data Briefs

"Foreign Citizens Continue To Increase U.S. Ranks of Science and Engineering Doctorate Recipients" **92-311**

"Graduate Enrollments Climb in Science, Engineering, and Health" **90-326**

"Graduate Enrollment in S&E Fields Increased by 4 Percent in 1990" **92-304**

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[4] Higher Education Survey number 15 included separate reports on physics, geology, and sociology.

Data Briefs—Continued

"Science and Engineering Doctoral Awards Reached Record Highs in 1990"	91-308
"S&E Baccalaureates Declined After 1986 as Masters and Doctoral Degrees Increased"	91-313
"U.S. Universities and Colleges Report a 9-Percent Net Increase in Research Space Since 1988, the Majority of It Within Doctorate-Granting Institutions"	92-333
"Women Continue To Earn Increasing Percentage of Science and Engineering Baccalaureates"	92-313

Highlights

"Doctoral Awards in the Sciences Reached Record High in 1988"	89-302
"Engineering Doctoral Awards Reached Record High in 1987"	88-334

Previews

"1988 Graduate Enrollment in Engineering Breaks 9-Year "Growth Pattern"	SRS 89-4
"Science and Engineering Doctoral Awards Reached All-Time Highs in 1988"	SRS 89-1
"Graduate S/E Enrollment at Doctorate-Granting Institutions Continues to Slow"	SRS 88-4

Science and Engineering Indicators Program

The Science and Engineering Indicators Program (IND) is responsible for the Division's cross-cutting overview and international reports. IND compiles and analyzes data from special studies, SRS surveys, and other national and international sources to produce the biennial Congressionally mandated report *Science and Engineering Indicators*. The *Indicators* report is produced under the guidance of the National Science Board and is the National Science Foundation's flagship quantitative report.

In addition, the IND program develops and publishes a number of specialized indicator series, particularly in the area of science and technology (S&T) output and impact indicators. These series include patent data, bibliometric indicators, high-technology trade data, information on innovation activities, and survey data on public attitudes toward and understanding of science and technology.

A major aspect of the IND program involves the development of international comparisons for all the S&T indicators areas. The program is the focal point both in the Division and NSF for international S&T indicators activities, including reporting U.S. data to international organizations such as the Organization for Economic Cooperation and Development and the United Nations Educational, Science and Cultural Organization. Periodic and special publications produced in the group include—

- ***National Patterns of R&D Resources***

  This report presents data on the Nation's overall R&D effort. It includes trends in R&D expenditures by source of funds and sector of performance. It also presents data on R&D by character of work and the number of scientists and engineers employed in R&D. This report complements the National Science Board's *Science and Engineering Indicators* report.

- ***Science and Technology Pocket Data Book***

  This is a quick and portable reference to selected data series of the *Science and Engineering Indicators* report.

- ***International Science and Technology Data Update***

  This report provides internationally comparative data on science and engineering capabilities in selected foreign countries. It covers R&D expenditures, S&E personnel data, and data on outputs such as patents, publications, and trade.

- ***Human Resources for Science and Technology: The Asian Region***

  This report provides for the first time a consistent database on human resources for science and engineering in six Asian countries—the People's Republic of China (China), India, Japan, Singapore, the Republic of Korea (South Korea), and the Republic of China (Taiwan).

Recurring Reports

Special Data Tables Reports	**NSF Report Number**
Geographic Patterns: R&D in the United States	89-317
Selected Data on Federal R&D Funding by Budget Function: FYs 1990-92	91-319

Special Reports

Federal R&D Funding by Budget Function:	
FYs 1992-94	93-311
FYs 1991-93	92-318
FYs 1989-91	90-311
FYs 1988-90	89-306
Human Resources for Science and Technology: The Asian Region	93-303
International Science and Technology Data Update:	
1991	91-309
1988	89-307
National Patterns of R&D Resources:	
1992	92-330
1990	90-316
1989	89-308
Science and Technology Pocket Data Book:	
1992	92-331
1990	90-304
1989	88-332
Survey of Direct U.S. Private Capital Investment in Research and Development Facilities in Japan	91-312

Data Briefs

"Asian Science and Engineering Degrees Top 700,000"	93-316
"Slow Growth Expected in U.S. R&D Spending for 1992"	92-308
"Two-Year Decline Expected in Real R&D Spending"	91-307
"U.S. Expenditures on R&D Expected to Increase in 1993"	93-318

Highlights

"Real R&D Growth To Slow to One Percent in 1989 and 1990"	90-308
"Substantial Shift Toward Slower R&D Growth Reported for Decade's End"	89-301

Reports of the National Science Board

Science and Engineering Indicators	
1989	NSB 89-1
1991	NSB 91-1
The Competitive Strength of U.S. Industrial Science and Technology: Strategic Issues[5]	NSB 92-138

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[5] National Science Board Committee on Industrial Support for R&D.

Science and Engineering Personnel Program

The Science and Engineering Personnel Program develops data on the nation's S&E workforce in close collaboration with the Census Bureau, the Bureau of Labor Statistics, and the Immigration and Naturalization Service. In addition to compiling administratively collected data on immigrant S&E workers, the group conducts three biennial surveys:

- The *National Survey of College Graduates,* based on a sample of about 215,000 individuals who reported on their 1990 Census returns that they had at least a bachelor's degree.

- The *Survey of Doctorate Recipients*, which samples about 50,000 holders of S&E doctoral degrees.

- The *Survey of Recent Graduates* (also known as the New Entrants Survey), which uses a two-stage probability sample of approximately 25,000 S&E bachelor's and master's degree recipients to track the early development of S&E careers.

Data from these three surveys are combined in a comprehensive model of the supply of trained scientists and engineers known as the Scientific and Technical Personnel Data System (STPDS). Additional data from Bureau of Labor Statistics Occupational Employment Surveys provide information on the demand side. The program is also responsible for a limited amount of work related to labor market modeling.

Recurring Reports

Detailed Statistical Tables Reports	**NSF Report Number**
Characteristics of Doctoral Scientists and Engineers in the United States: 1989	91-317
Characteristics of Recent Science and Engineering Graduates:	
1990	92-316
1988	90-305
Federal Scientists and Engineers:	
1988	89-322
1987	89-303
Immigrant Scientists and Engineers:	
1990	93-317
1988	90-313
Scientists, Engineers, and Technicians in Nonmanufacturing Industries:	
1990	92-334
1987	89-321
Scientists, Engineers, and Technicians in Manufacturing Industries: 1989	92-312
Scientists, Engineers, and Technicians in Trade and Regulated Industries: 1988	90-317
Scientists, Engineers, and Technicians in Trade and Regulated Industries: 1991	93-307
U. S. Scientists and Engineers: 1988	90-314

Selected Data Tables Report

Science and Engineering Personnel: A National Overview	90-310

Special Reports

Using the Survey of Doctorate Recipients To Measure the Number of Academic Research Personnel 92-315

Data Briefs

"Favorable Employment Opportunities for Recent S/E Graduates" 90-315

"Scientists, Engineers, and Technicians Are Highly Concentrated in High Tech Industries" 91-321

"Steady Growth of Employed Ph.D. Scientists and Engineers Is Maintained" 91-303

"Using the Survey of Doctorate Recipients To Measure the Number of Academic Research Personnel" 92-314

Highlights

"Pace of Retirements of Ph.D. Scientists and Engineers Shows Gradual Increase" 89-305

"Services-Producing Industries Should Lead in Growth of Science/Engineering Jobs Through the Year 2000" *88-328*

Profiles

Aeronautical/Astronautical Engineering: Human Resources and Funding	89-314
Agricultural Sciences: Human Resources and Funding	89-319
Biological Sciences: Human Resources and Funding	89-318
Chemical Engineering: Human Resources and Funding	89-312
Civil Engineering: Human Resources and Funding	90-303
Economics: Human Resources and Funding	88-333

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